
PDGF-BB does not accelerate healing in diabetic mice with splinted skin wounds.

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Public Summary:

Topical application of platelet-derived growth factor-BB (PDGF-BB) is considered to accelerate tissue repair of impaired chronic wounds. However, the vast literature is plagued with conflicting reports of its efficacy in animal models and this is often influenced by a wide array of experimental variables making it difficult to compare the results across the studies. To mitigate the confounding variables that influence the efficacy of topically applied PDGF-BB, we used a controlled full thickness splinted excisional wound model in db/db mice (type 2 diabetic mouse model) for our investigations. A carefully-defined silicone-splinted wound model, with reduced wound contraction, controlled splint and bandage maintenance, allowing for healing primarily by reepithelialization was employed. Two splinted 8 mm dorsal full thickness wounds were made in db/db mice. Wounds were topically treated once daily with either 3 µg PDGF-BB in 30 µl of 5% PEG-PBS vehicle or an equal volume of vehicle for 10 days. Body weights, wound contraction, wound closure, reepithelialization, collagen content, and wound bed inflammation were evaluated clinically and histopathologically. The bioactivity of PDGF-BB was confirmed by in vitro proliferation assay. PDGF-BB, although bioactive in vitro, failed to accelerate wound healing in vivo in the db/db mice using the splinted wound model. Considering that the predominant mechanism of wound healing in humans is by re-epithelialization, the most appropriate model for evaluating therapeutics is one that uses splints to prevent excessive wound contraction. Here, we report that PDGF-BB does not promote wound closure by re-epithelialization in a murine splinted wound model. Our results highlight that the effects of cytoactive factors reported in vivo ought to be carefully interpreted with critical consideration of the wound model used.

Scientific Abstract:

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